1. The principle of randomization in experimental design ensures that:
   1. Subjects are matched based on characteristics.
   2. The likelihood of bias is minimized.
   3. Subjects are pretested before the experiment.
   4. Data collection methods are standardized.
2. In your view, how does the principle of randomization improve the validity of an experiment?
3. Analyze the role of sampling methods in determining the accuracy of research findings.
4. Which of the following best captures the aim of the 'Principle of Local Control'?
   1. Minimize bias by random assignment.
   2. Account for the effect of extraneous variables.
   3. Repeat the experimentation multiple times.
   4. Use small sample sizes for better accuracy.
5. True or False: Descriptive statistics are used to infer conclusions beyond the immediate data.
   1. True
   2. False
6. Illustrate with an example how to use a factorial design in an experimental study.
7. True or False: Factorial design experiments are used to study the independent and combined effects of two or more variables.
   1. True
   2. False
8. What type of data collection method involves systematically watching and recording behavior or events as they occur?
   1. Survey
   2. Interview
   3. Observation
   4. Questionnaire
9. The term 'extraneous variables' refers to:
   1. Variables that are manipulated in an experiment.
   2. Uncontrolled variables that affect the dependent variable.
   3. Variables that are controlled to ensure validity.
   4. Variables not related to the experiment.
10. What is the main goal of hypothesis-testing research design?
    1. To explore new areas where little is known
    2. To describe the characteristics of a specific group
    3. To establish cause-and-effect relationships
    4. To diagnose issues or problems
11. What is the main feature of a Quasi-Experimental Design?
    1. Random assignment to groups is used.
    2. There is no manipulation of the independent variable.
    3. It is used only for qualitative research.
    4. It does not use random assignment to groups.
12. True or False: Exploratory research is primarily used to test hypotheses.
    1. True
    2. False
13. True or False: In longitudinal data analysis, observations are made at multiple time points.
    1. True
    2. False
14. Which type of research design involves manipulation of an independent variable to observe its effect on a dependent variable?
    1. Correlational Research Design
    2. Experimental Research Design
    3. Explanatory Research Design
    4. Exploratory Research Design
15. Which of the following is an example of an inferential statistical method?
    1. Calculating the mean
    2. Generating a frequency table
    3. Conducting a regression analysis
    4. Creating a histogram
16. Which statistical tool is used to summarize the magnitude and direction of a relationship between two variables?
    1. Regression Analysis
    2. ANOVA
    3. Chi-Square Test
    4. T-Test
17. Select all characteristics that define qualitative research.
    1. Focus on numerical data
    2. Holistic approach
    3. Subjective analysis
    4. Use of statistical tests
18. In the context of reliability, what does MTBF stand for?
    1. Mean Time Before Failure
    2. Mean Time Between Failures
    3. Maximum Time Between Failures
    4. Minimum Time Before Failure
19. Describe the process and significance of hypothesis testing in scientific research.
20. What does 'research methodology' refer to?
    1. Specific techniques used for data collection and analysis.
    2. The general approach guiding a research project.
    3. The theory underlying the methods used in a study.
    4. The statistical tools used in experimental research.
21. Explain the key differences between exploratory and explanatory research designs.
22. Describe a situation where using a quasi-experimental design may be more advantageous than a true experimental design.
23. What does the term 'internal validity' refer to in research design?
    1. The extent to which results can be generalized to other settings.
    2. The measure of how well the study is conducted internally.
    3. The statistical methods used in data analysis.
    4. The applicability of the results to real-world scenarios.
24. Why might a researcher choose to conduct a longitudinal study instead of a cross-sectional study?
25. Which of these variables can be manipulated in experimental research?
    1. Dependent Variable
    2. Extraneous Variable
    3. Independent Variable
    4. Control Variable
26. True or False: In a randomized block design, subjects are grouped based on a blocking variable before being randomly assigned to treatment groups.
    1. True
    2. False
27. True or False: Randomized sampling methods decrease the likelihood of a biased sample.
    1. True
    2. False
28. How do external factors influence the reliability of an experimental study's results?
29. Select the different data types commonly used in research.
    1. Binary Data
    2. Nominal Data
    3. Oral Data
    4. Ordinal Data
30. Reflect on the ethical considerations when conducting experimental research and how they might impact the study design.
31. Which of these research designs focuses on studying patterns and relationships between variables?
    1. Explanatory Research Design
    2. Descriptive Research Design
    3. Exploratory Research Design
    4. Diagnostic Research Design
32. True or False: Cross-sectional research design involves collecting data from the same subjects repeatedly over a period of time.
    1. True
    2. False
33. True or False: Reliability and availability are the same concepts in the context of research instrumentation.
    1. True
    2. False
34. What does the F-test in statistical analysis determine?
    1. The mean difference between two groups.
    2. The significance of the variance of two or more groups.
    3. The relationship between two continuous variables.
    4. The correlation between two ranked variables.
35. True or False: The use of randomized sampling methods increases the external validity of a study.
    1. True
    2. False
36. Which research design involves studying the same subjects over a prolonged period?
    1. Cross-Sectional Design
    2. Pre-Test Post-Test Design
    3. Longitudinal Design
    4. Quasi-Experimental Design
37. Which statement best describes a completely randomized design?
    1. It involves random assignment of subjects to all groups, including control and experimental groups.
    2. It involves pretesting subjects before the experimental treatment.
    3. It involves matching subjects based on certain characteristics before random assignment.
    4. It involves keeping some variables constant while manipulating others.
38. Discuss the importance of reliability and validity in the context of scientific measurements.
39. Which of the following best describes the concept of 'external validity'?
    1. The degree to which the results of a study apply to individuals and contexts beyond those studied.
    2. The accuracy with which an instrument measures the variable it is intended to measure.
    3. The degree to which the study accurately measures what it claims to measure.
    4. The consistency of a research study or measuring test.
40. What are the potential challenges in ensuring internal validity in experimental designs, and how can they be mitigated?
41. Which of the following is NOT a type of experimental design?
    1. Post-Test Only Design
    2. Descriptive Research Design
    3. Randomized Block Design
    4. Latin Square Design
42. True or False: In experimental research, the principle of local control refers to accounting for external variables that may influence the dependent variable.
    1. True
    2. False
43. What is the principle of replication in experimental research?
    1. It involves using the same experimental setup multiple times.
    2. It involves random assignment of subjects to different groups.
    3. It involves controlling for external factors in the experiment.
    4. It involves ensuring that the results are statistically significant.
44. Which research tool helps in managing and organizing bibliography citations?
    1. SPSS
    2. EndNote
    3. SAS
    4. MATLAB
45. Select the correct components involved in Calculating Mean Time To Repair (MTTR).
    1. Total Maintenance Down Time
    2. Total Number of Failures
    3. Total Operating Time
    4. Total Number of Maintenance Actions